



US005896506A

**United States Patent [19]****Ali et al.**

[11] Patent Number: **5,896,506**  
 [45] Date of Patent: **Apr. 20, 1999**

**[54] DISTRIBUTED STORAGE MANAGEMENT SYSTEM HAVING A CACHE SERVER AND METHOD THEREFOR**

[75] Inventors: **Seifu Ali**, Santa Clara, Calif.; **Thomas G. Burkett**, Potomac, Md.; **Tawei Hu**, San Jose, Calif.; **Gerald Edward Kozina**, Cupertino, Calif.; **Thomas S. Lee**, San Jose, Calif.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **08/656,441**

[22] Filed: **May 31, 1996**

[51] Int. Cl.<sup>6</sup> ..... **G06F 13/38; G06F 15/17**

[52] U.S. Cl. ..... **395/200.43; 395/200.46**

[58] Field of Search ..... **707/1, 10, 9, 200, 707/2; 395/200.31, 200.49, 200.38, 200.46, 200.43; 711/138, 130**

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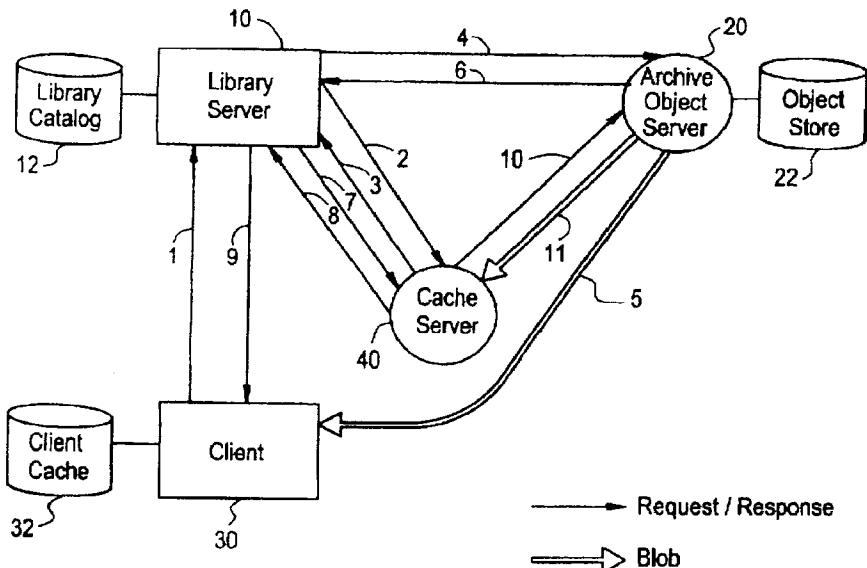
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Primary Examiner—Mark H. Rinehart  
 Attorney, Agent, or Firm—Sughrue, Mion, Zinn, Macpeak & Seas, PLLC

**[57] ABSTRACT**

The present invention is directed to a method and system for storing and managing objects, such as binary large objects (blobs) in a digital library system which includes a plurality of clients, an object server for storing an object, a cache server for storing a copy of the object, and a centralized server for storing information identifying the object as being stored in the object server and associating one or more of the clients with the cache server, in which one of the clients, as a requesting client, requests retrieval of an object, a copy of the requested object is sent from the cache server to the requesting client if the object is stored in said cache server, and a copy of said object is sent from the object server to said requesting client if the object is not stored in the cache server; and a copy of the requested object is sent from the object server to the cache server after the object server sends the object to the client, in which the object sent to the client is made available to the client regardless of whether sending of the copy of the object to the cache server is completed.

**18 Claims, 8 Drawing Sheets****ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.M./**



US005968125A

**United States Patent** [19]  
**Garrick et al.**

[11] **Patent Number:** **5,968,125**  
[45] **Date of Patent:** **Oct. 19, 1999**

[54] **PROCESS FOR OPTIMIZING THE EFFECTIVENESS OF A HYPERTEXT ELEMENT**

[75] Inventors: **George R. Garrick**, Chicago; **Scott D. Weaver**, Deerfield, both of Ill.

[73] Assignee: **Net. Roi**, Chicago, Ill.

[21] Appl. No.: **08/787,532**

[22] Filed: **Jan. 21, 1997**

[51] Int. Cl.<sup>6</sup> ..... **G06F 13/00**

[52] U.S. Cl. ..... **709/224; 709/219; 707/501; 707/513**

[58] Field of Search ..... **709/203, 219, 709/207, 231, 224, 217, 218; 705/10; 395/200.54; 707/501, 513**

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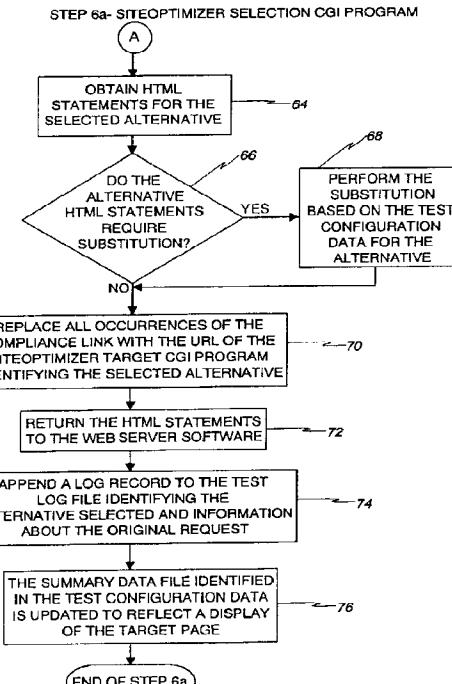
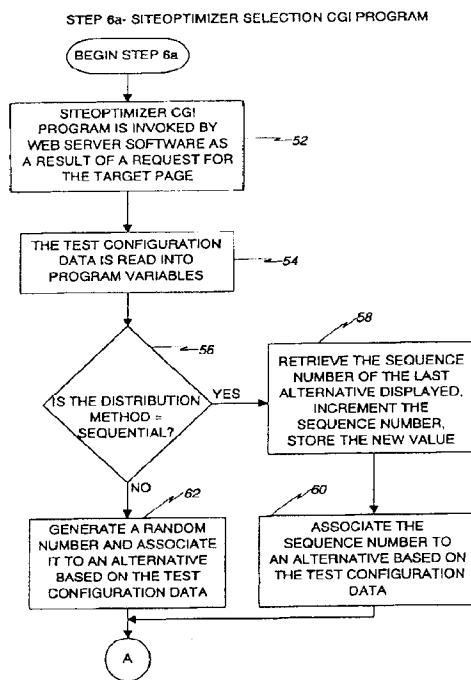
*Primary Examiner*—Zarni Maung

*Assistant Examiner*—Patrice L. Winder

[57] **ABSTRACT**

A process for optimizing the effectiveness of a web site analyzes various hypertext variables of hypertext documents formed from Hyper Text Mark-up Language (HTML) to identify weak links in order to improve compliances with the business objective for the web site. A plurality of alternate hypertext documents are created and placed in parallel paths relative to the original hypertext document according to a predetermined distribution pattern which may be sequential, equal distribution or random distribution, for example. Accesses to the web site are redirected to the alternative hypertext elements transparently. Access logs for each of the alternative hypertext documents are analyzed to determine the most effective alternative hypertext document, according to a predetermined criteria. The most effective hypertext element is then substituted for the original hypertext element in order to improve the effectiveness of the web site.

**8 Claims, 22 Drawing Sheets**





US006081829A

**United States Patent [19]****Sidana****[11] Patent Number: 6,081,829  
[45] Date of Patent: \*Jun. 27, 2000****[54] GENERAL PURPOSE WEB ANNOTATIONS WITHOUT MODIFYING BROWSER****[75] Inventor:** **Ashmeet S. Sidana**, Mountain View, Calif.**[73] Assignee:** **Silicon Graphics, Inc.**, Mountain View, Calif.**[\*] Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).**[21] Appl. No.: 08/594,873****[22] Filed:** Jan. 31, 1996**[51] Int. Cl.<sup>7</sup>** ..... G06F 15/16**[52] U.S. Cl.** ..... 709/203; 707/512**[58] Field of Search** ..... 395/200.15, 200.03, 395/200.18, 200.31, 200.33, 200.76; 707/512Martin Roscheisen et al, "Content Ratings and Other Third-Party Value-Added Information Defining an Enabling Platform", <http://www.cnri.neston.va.us/home/dlib/August95/Stanford/08roscheisen.html> Aug. 1995, pp. 1-2.Martin Roscheisen et al, "Shared web Annotations As a Platform for Third-Party Value Added Information Providers", <http://www.digilib.stanford.edu/digilib/pub/report/commentor.html>, Nov. 94, pp. 1-33.Martin Roscheisen et al, "ComMentor", <http://Walros.Stanford.EDU/Commentor/24Jan.1995> pp. 1-2.Jim Davis, "CoNote, Draft in Progress", <http://dri.cornell.edu/pub/davis/Annotation/about.html>, Jan. 23, 1995 pp. 1-6.Wayne C. Gramlich, "Public Annotation Systems", <http://playground.sun.com:80/ngramlich/1994/annotel>, 1994.

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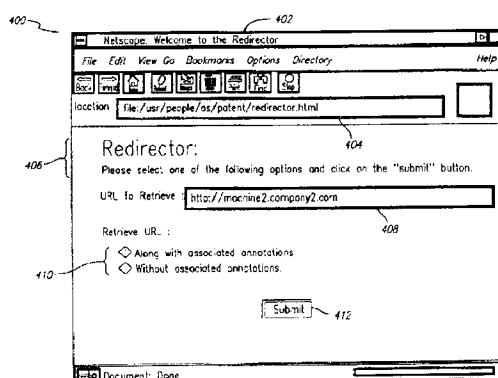
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Martin Roscheisen et al, "Beyond Browsing: Shared Comments, Soaps, Trails, and On-Line Communications", <http://www.digilib.stanford.edu/digilib/pub/reports/brio.www95.html> pp. 1-15 Apr. 1995.

**Primary Examiner—Mehmet B. Geckil  
Attorney, Agent, or Firm—Graham & James LLP****[57] ABSTRACT**

A general purpose system and method for associating annotations, modifications, or other information with a web-viewable document is disclosed. An embodiment of the system and method includes the use of a "redirector." A user attempting to access a document at a particular web address, sends a request to view the document to that address. The request is intercepted by the redirector which, in turn, requests the document on behalf of the user. The redirector modifies the document and returns the modified document for viewing by the user. The modifications may include, for example, various comments or annotations to the original web-viewable document. According to the invention, such customized documents may be presented to the user without modification of commercially available browser and/or server software.

**25 Claims, 11 Drawing Sheets**



US006298356B1

(12) **United States Patent**  
Jawahar et al.

(10) **Patent No.:** US 6,298,356 B1  
(45) **Date of Patent:** Oct. 2, 2001

(54) **METHODS AND APPARATUS FOR ENABLING DYNAMIC RESOURCE COLLABORATION**

(75) Inventors: **Janardhanan Jawahar**, San Jose; **Venkatachari Dilip**, Cupertino, both of CA (US)

(73) Assignee: **Aspect Communications Corp.**, San Jose, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/197,011

(22) Filed: Nov. 20, 1998

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/008,523, filed on Jan. 16, 1998, now abandoned.

(51) Int. Cl.<sup>7</sup> G06F 17/30

(52) U.S. Cl. 707/201; 707/10; 707/513; 707/2; 711/113; 709/203

(58) Field of Search 707/201, 202, 707/2, 10, 513; 709/204, 203; 711/113

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*Primary Examiner*—Jack Choules

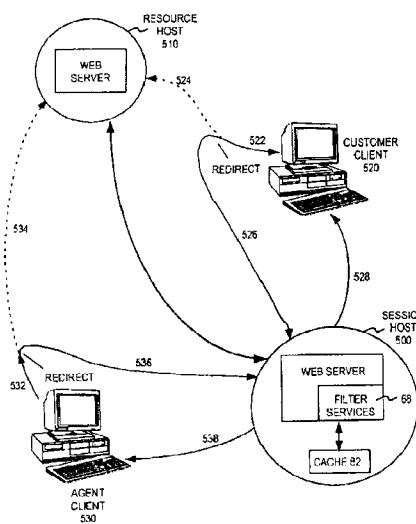
*Assistant Examiner*—Cheryl Lewis

(74) Attorney, Agent, or Firm—Davis & Johnson, LLP;  
William D. Davis

**ABSTRACT**

Methods and apparatus for enabling collaboration with web pages and other resources is described. A method includes the step of establishing a collaboration session between a first client and a second client. A requested resource is cached with the session host in response to a request having a first uniform resource locator (URL) issued by the first client, if the requested resource is a pre-determined type of resource. A second URL is provided to the second client. The second URL identifies the requested resource or the cached resource in accordance with whether the requested resource is cached. Apparatus for enabling collaboration includes a web server, a cache, and a filter. The web server provides a requested web page in response to a first client's request. The filter stores the requested web page in the cache, if the requested web page is a pre-determined type of web page. A number of pre-determined characteristics for caching are described in various embodiments of the methods and apparatus. In one embodiment, the requested resource is cached if it is a dynamic web page. In one embodiment an expiration date of the requested resource determines whether the requested resource should be cached. In another embodiment, a filename associated with the requested resource determines whether the requested resource should be cached. In another embodiment, components of the request determine whether the requested web page should be cached.

27 Claims, 16 Drawing Sheets





US006330561B1

(12) **United States Patent**  
Cohen et al.

(10) **Patent No.:** US 6,330,561 B1  
(45) **Date of Patent:** Dec. 11, 2001

(54) **METHOD AND APPARATUS FOR IMPROVING END TO END PERFORMANCE OF A DATA NETWORK**

(75) Inventors: Edith Cohen, Berkeley Heights, NJ (US); Balachander Krishnamurthy, New York City, NY (US); Jennifer Lynn Rexford, Summit, NJ (US)

(73) Assignee: AT&T Corp., New York, NY (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/105,018

(22) Filed: Jun. 26, 1998

(51) Int. Cl.<sup>7</sup> G06F 17/30

(52) U.S. Cl. 707/10; 707/2; 707/104

(58) Field of Search 707/101, 103, 707/10, 2, 104; 709/203, 228, 219, 247, 217, 202, 226, 223, 231, 200; 455/4.2; 711/122; 713/201

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Primary Examiner—Wayne Armsbury

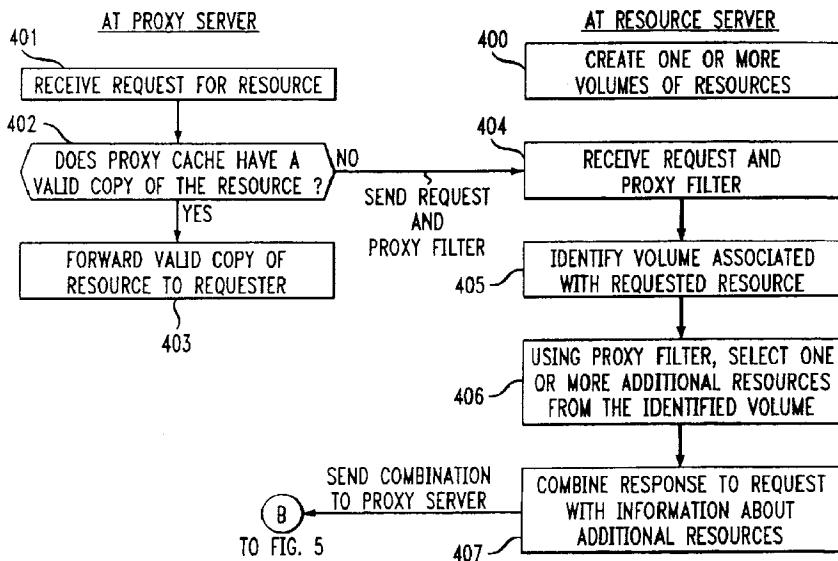
Assistant Examiner—Thuy Pardo

(74) Attorney, Agent, or Firm—Kenyon & Kenyon

(57) ABSTRACT

A method and apparatus provide improved cache coherency and more effective caching operations without placing an undue burden on network links. A proxy receives a request for a resource and then, depending on information in the proxy cache, generates a resource request for transmission to a resource server. The proxy appends a proxy filter to the request. The resource server maintains one or more volumes of resources based on some predetermined criterion that can be either static or dynamic in nature. Upon receipt of the request and the proxy filter the resource server generates a request response and a piggybacked list of additional resources selected from the volume with which the requested resource is associated.

4 Claims, 3 Drawing Sheets





US006470386B1

(12) **United States Patent**  
Combar et al.

(10) **Patent No.:** US 6,470,386 B1  
(45) **Date of Patent:** Oct. 22, 2002

(54) **INTEGRATED PROXY INTERFACE FOR WEB BASED TELECOMMUNICATIONS MANAGEMENT TOOLS**

(75) Inventors: Curtis T. Combar, Woodland Park; Robert A. Pfister, Colorado Springs, both of CO (US)

(73) Assignee: WorldCom, Inc., Clinton, MS (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/159,516

(22) Filed: Sep. 24, 1998

**Related U.S. Application Data**

(60) Provisional application No. 60/060,655, filed on Sep. 26, 1997.

(51) Int. Cl. 7 .....

G06F 15/173

(52) U.S. Cl. .... 709/224; 705/40

(58) Field of Search ..... 709/224, 223, 709/218, 217, 219, 229; 379/112, 201, 265, 114, 140; 713/151, 154; 705/63, 75, 40, 44, 77

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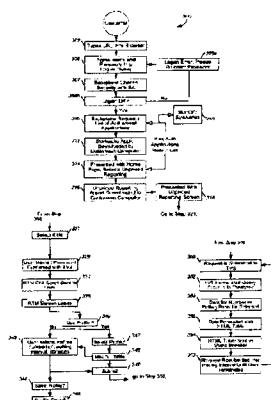
*Primary Examiner—Robert B. Harrell*

*Assistant Examiner—Bunjob Jaroenchonwanit*

**ABSTRACT**

A Web/Internet based monitoring system provides a common GUI enabling the requesting and real-time viewing of telecommunication network traffic and statistical data pertaining to a customer's telecommunication network. Such a monitoring system includes: a client browser application located at a client workstation for enabling interactive Web based communications between a customer and the monitoring system; at least one secure server for managing client sessions over the Internet via one or more secure connections; a device for generating statistical data based on real-time call data obtained from a telecommunications network, the statistical data being generated according to a pre-defined user profile; a mechanism for periodically retrieving the statistical data according to the user profile and for integrating the retrieved statistical data within a Web page for presentation to the user over a secure socket connection at pre-defined intervals. The Web page is updated to contain the latest generated statistical data each interval.

17 Claims, 21 Drawing Sheets





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(19) United States

(12) Patent Application Publication

Khan et al.

(10) Pub. No.: US 2002/0165988 A1

(43) Pub. Date: Nov. 7, 2002

(54) SYSTEM, METHOD, AND ARTICLE OF  
MANUFACTURE FOR WIRELESS  
ENABLEMENT OF THE WORLD WIDE WEB  
USING A WIRELESS GATEWAY

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(21) Appl. No.: 10/165,734

(22) Filed: Jun. 6, 2002

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/595,781,  
filed on Jun. 16, 2000, now Pat. No. 6,438,575.

(60) Provisional application No. 60/210,160, filed on Jun.  
7, 2000. Provisional application No. 60/209,873, filed  
on Jun. 7, 2000.

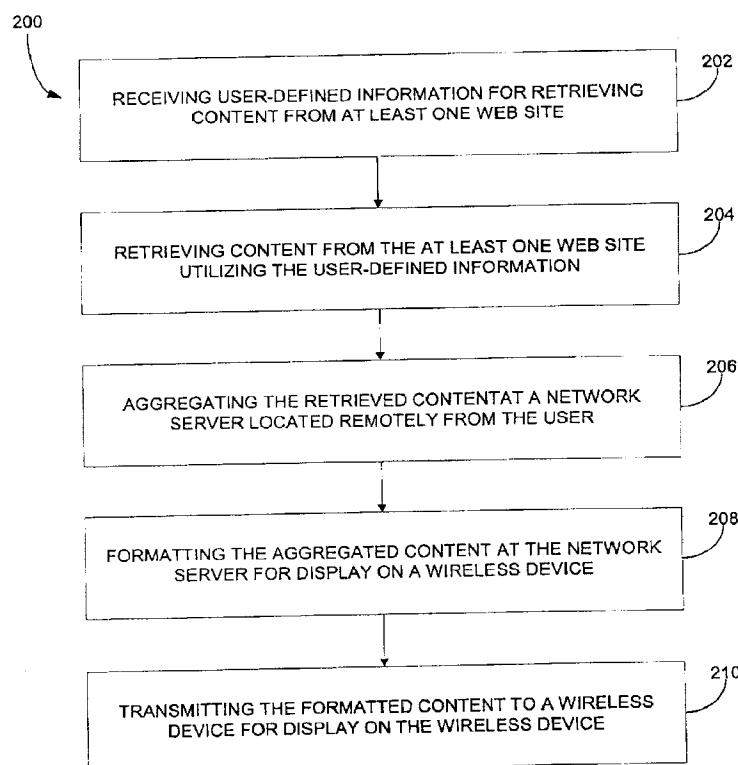
Publication Classification

(51) Int. Cl.<sup>7</sup> ..... G06F 15/16  
(52) U.S. Cl. ..... 709/246; 709/217

(57)

ABSTRACT

A system, method and article of manufacture are provided for selection and formatting of web content for remote viewing. User-defined information is received and used to retrieve content from one or more web sites. The retrieved content is aggregated at a network server located remotely from the user. The aggregated content is formatted at the network server for display on a wireless device. The formatted content is transmitted to a wireless device for display on the wireless device.





US006714979B1

(12) **United States Patent**  
Brandt et al.

(10) Patent No.: US 6,714,979 B1  
(45) Date of Patent: Mar. 30, 2004

## (54) DATA WAREHOUSING INFRASTRUCTURE FOR WEB BASED REPORTING TOOL

(75) Inventors: **Andre R. Brandt**, Colorado Springs, CO (US); **Barbara Frueh**, Colorado Springs, CO (US); **Sajan J. Pillai**, Colorado Springs, CO (US); **Karl Rehder**, Colorado Springs, CO (US); **Donald J. Shearer**, Colorado Springs, CO (US)

(73) Assignee: WorldCom, Inc., Clinton, MS (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/159,402

(22) Filed: Sep. 24, 1998

#### **Related U.S. Application Data**

(60) Provisional application No. 60/060,655, filed on Sep. 26, 1997.

(51) Int. Cl.<sup>7</sup> ..... G06F 15/173  
(52) U.S. Cl. ..... 709/225; 709/205; 709/217;  
709/223; 709/227; 709/229; 707/3; 707/4;  
707/9; 707/10

(58) Field of Search ..... 709/205, 225,  
709/227, 224, 219, 217, 228, 229, 223;  
705/26, 18, 27, 51, 34; 713/155, 201, 152;  
707/102, 523, 513, 2, 9, 3, 6, 10; 379/114.01,  
114.02, 114.28, 114.29

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| 4,893,248 Å | 1/1990  | Pitts et al. ....       | 705/400    |
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**HP Smart Internet Usage Analysis Solution, Transform User  
Data Into Competitive Advantage.\***

**Data Into Competitive Advantage.  
HP/Cisco, Internet Usage Platform, Transforming Internet  
Services Into Revenue.\***

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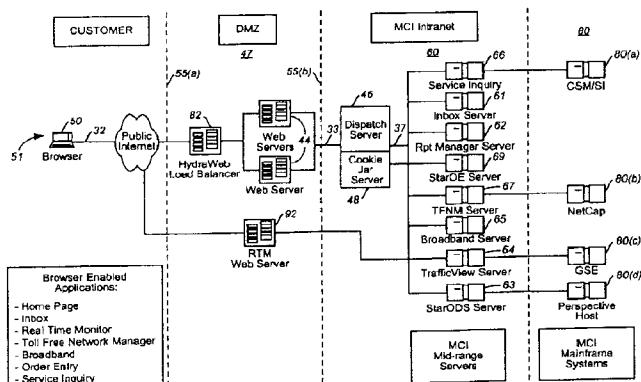
*Primary Examiner*—David Wiley

*Assistant Examiner*—William C. Vaughn, Jr.

## ABSTRACT

A data warehousing infrastructure for telecommunications priced call detail data is integrated with a Web/Internet based reporting system providing a common GUI enabling the requesting, customizing, scheduling and viewing of various types of priced call detail data reports. Such an infrastructure performs an extraction process to obtain only those billing detail records of entitled customers, and a harvesting process for transforming the billing records into a star schema format for storage in one or more operational data storage devices. The system is integrated with a database server supporting expedient and accurate access to the customer's telecommunications priced call detail data for priced call detail data report generation.

**37 Claims, 23 Drawing Sheets**



ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.M./



US006993559B2

(12) **United States Patent**  
Jilk, Jr. et al.(10) **Patent No.:** US 6,993,559 B2  
(45) **Date of Patent:** Jan. 31, 2006(54) **SYSTEM, METHOD, APPARATUS AND COMPUTER PROGRAM PRODUCT FOR OPERATING A WEB SITE BY ELECTRONIC MAIL**5,835,712 A 11/1998 DuFresne ..... 395/200.33  
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5,918,013 A 6/1999 Mighdoli et al. .... 395/200.47(75) Inventors: **David J. Jilk, Jr.**, Superior, CO (US); **Daniel A. Checkoway**, Santa Ana, CA (US); **Jonathan P. Hoffman**, Covina, CA (US); **Ralph A. Clark**, Oakland, CA (US)(73) Assignee: **BigBow.com, Inc.**, Oakland, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1070 days.

(21) Appl. No.: 09/780,044

(22) Filed: Feb. 9, 2001

(65) **Prior Publication Data**

US 2002/0010746 A1 Jan. 24, 2002

**Related U.S. Application Data**

(60) Provisional application No. 60/182,280, filed on Feb. 14, 2000.

(51) Int. Cl.  
*G06F 15/16* (2006.01)(52) U.S. Cl. .... 709/206; 709/217; 709/219;  
709/225; 709/246(58) Field of Classification Search ..... 709/206,  
709/207, 217, 219, 225, 246  
See application file for complete search history.(56) **References Cited****U.S. PATENT DOCUMENTS**5,572,643 A 11/1996 Judson ..... 395/793  
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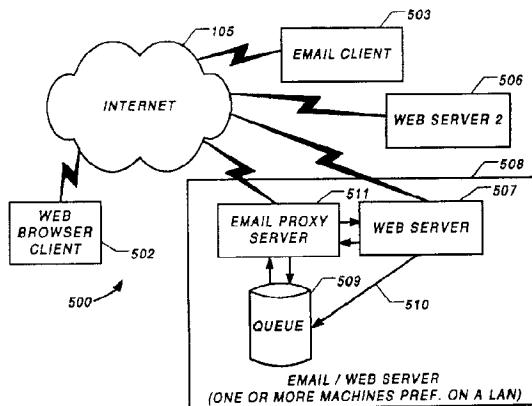
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*Primary Examiner*—Saleh Najjar*Assistant Examiner*—Liang-che Wang(74) *Attorney, Agent, or Firm*—Dov Rosenfeld Inventek(57) **ABSTRACT**

Method, product, and apparatus of operating one or more Web pages by email. One embodiment of the method includes sending a first Web page to a first email address via a computer network as a first email message. The sent first Web page may include one or more of links or forms for further interaction, and is in a format consistent with an email environment such that the Web page is directly operable in an email browser of the environment. A user receiving the first email containing the first Web page may respond by operating the received first Web page, and this response may lead to a second email message that includes a URL request or form data being sent by the user to a second email address via the computer network. The method further includes retrieving the second email message, interpreting the URL request or form data of the retrieved second email message, retrieving a second Web page from a Web server connected to the computer network in accordance with the interpreted URL request or form data, and transcoding the retrieved second Web page from a Web browser format to a third format consistent with one or more properties of a second email environment.

**78 Claims, 22 Drawing Sheets**



US007032031B2

(12) **United States Patent**  
Jungck et al.(10) **Patent No.:** US 7,032,031 B2  
(45) **Date of Patent:** Apr. 18, 2006(54) **EDGE ADAPTER APPARATUS AND METHOD**5,805,820 A 9/1998 Bellovin et al. .... 395/200.55  
5,867,704 A 2/1999 Tanaka et al. .... 718/105(75) Inventors: **Peder J. Jungck**, San Carlos, CA (US);  
**Zahid Najam**, San Jose, CA (US);  
**Andrew T. Nguyen**, San Jose, CA (US);  
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(21) Appl. No.: 09/858,309

(22) Filed: May 15, 2001

## (65) Prior Publication Data

US 2002/0009079 A1 Jan. 24, 2002

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Primary Examiner—Thong Vu

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(57)

## ABSTRACT

An apparatus and method for enhancing the infrastructure of a network such as the Internet is disclosed. A packet interceptor/processor apparatus is coupled with the network so as to be able to intercept and process packets flowing over the network. Further, the apparatus provides external connectivity to other devices that wish to intercept packets as well. The apparatus applies one or more rules to the intercepted packets which execute one or more functions on a dynamically specified portion of the packet and take one or more actions with the packets. The apparatus is capable of analyzing any portion of the packet including the header and payload. Actions include releasing the packet unmodified, deleting the packet, modifying the packet, logging/storing information about the packet or forwarding the packet to an external device for subsequent processing. Further, the rules may be dynamically modified by the external devices.

108 Claims, 9 Drawing Sheets

(63) Continuation-in-part of application No. 09/602,129, filed on Jun. 23, 2000, now Pat. No. 6,829,654.

(51) Int. Cl.  
*G06F 15/16* (2006.01)

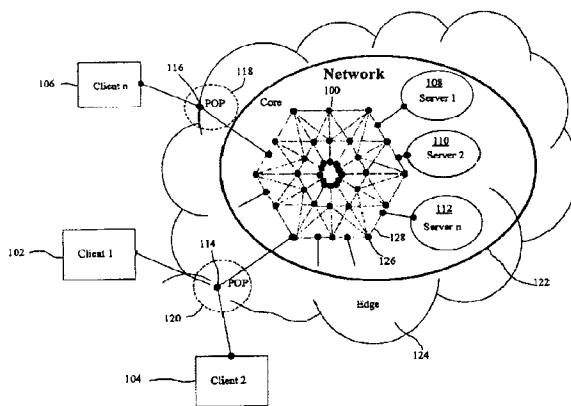
(52) U.S. Cl. .... 709/246; 709/203

(58) Field of Classification Search .... 709/246,  
709/236, 227, 225, 229, 231, 240, 245, 203;  
713/201, 166; 707/6, 10, 101, 104, 9; 715/536;  
370/390, 401, 233, 395, 389

See application file for complete search history.

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US006502125B1

(12) **United States Patent**  
Kenner et al.

(10) **Patent No.:** US 6,502,125 B1  
(45) **Date of Patent:** Dec. 31, 2002

(54) **SYSTEM AND METHOD FOR OPTIMIZED STORAGE AND RETRIEVAL OF DATA ON A DISTRIBUTED COMPUTER NETWORK**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 89 days.

(21) Appl. No.: 09/635,289

(22) Filed: Aug. 9, 2000

**Related U.S. Application Data**

(63) Continuation of application No. 09/213,946, filed on Dec. 17, 1998, now Pat. No. 6,154,744, which is a continuation of application No. 08/733,516, filed on Oct. 18, 1996, now Pat. No. 6,003,030, which is a continuation-in-part of application No. 08/660,540, filed on Jun. 7, 1996, now Pat. No. 5,956,716, which is a continuation-in-part of application No. 08/486,517, filed on Jun. 7, 1995, now Pat. No. 6,181,867.

(51) Int. Cl. 7 ..... G06F 17/30

(52) U.S. Cl. ..... 709/203; 709/224

(58) Field of Search ..... 709/217, 203, 709/219, 223, 224, 226; 707/10

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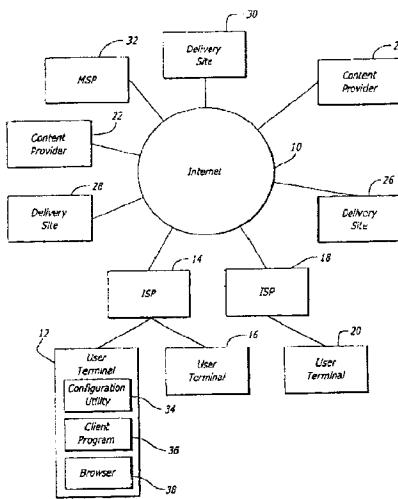
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**ABSTRACT**

A system and method for the optimized storage and retrieval of video data at distributed sites calls for the deployment of "Smart Mirror" sites throughout a network, each of which maintains a copy of certain data managed by the system. Every user is assigned to a specific delivery site based on an analysis of network performance with respect to each of the available delivery sites. Generalized network performance data is collected and stored to facilitate the selection of additional delivery sites and to ensure the preservation of improved performance in comparison to traditional networks.

**10 Claims, 3 Drawing Sheets**



09/11/2008

/John Macilwinen/

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.M./